CLAIMS

What is claimed is:

1. A method for automating a laser capture microdissection, the method comprising:

providing a fluorescently-labeled tissue sample on a microscope slide, wherein the fluorescent label on the tissue corresponds to a biological property of interest;

providing a source of fluorescent excitation, wherein an excitation beam emitted by the source is of an intensity and wavelength to excite a fluorescent label associated with the labeled tissue sample;

exciting the tissue sample with the excitation beam and recording at least one information corresponding to an excitation pattern of the tissue sample;

selecting from the recorded information, at least one section of the tissue sample for capture by laser capture microdissection; and

targeting a laser for selectively capturing the at least one section of the tissue sample by laser capture microdissection.

2. The method of claim 1, wherein the at least one information corresponding to an excitation pattern of the tissue sample is a set of positional coordinates of sections of the tissue sample with increased fluorescence.

3. The method of claim 1, wherein the source of fluorescent excitation is an EPI laser lamp.

4. The method of claim 1, further comprising:

providing a fluorescent filter for selectively recording fluorescence of the tissue sample at a particular frequency.

5. The method of claim 1, further comprising:

selecting a tissue sample section of interest by capturing an image of a fluorescent tissue sample.

6. The method of claim 4, wherein the image of the fluorescent tissue sample is captured by a color camera or a black and white camera.

7. The method of claim 4, further comprising:

analyzing the captured image of the fluorescent tissue sample by scanning the image for locations of enhanced fluorescence; and

responsive to the scanned information, selecting one or more sections of the tissue sample for laser capture microdissection.

8. The method of claim 4, further comprising:

analyzing the captured image of the fluorescent tissue sample by displaying the image in a video monitor; and

selecting locations of enhanced fluorescence on the tissue sample by inputting a selection into an I/O device.

9. The method of claim 1, further comprising:

providing a transfer film carrier cap having a substrate surface and a laser capture microdissection transfer film coupled to the substrate surface;

positioning the laser capture microdissection transfer film adjacent to the selected section of the sample to allow a specific transfer of the section of the tissue sample to the laser capture microdissection transfer film upon excitation with a laser energy; and

transferring a portion of the sample to the laser capture microdissection transfer film.

10. An automated cap transfer system comprising:

a horizontal bar coupled to a main support bar by a vertical lead screw, whereby operation of the lead screw actuates a vertical displacement of the horizontal bar relative to the support bar;

a fork coupled to the horizontal bar, the fork having two or more arms for engaging a LCM cap;

a pivotable weight coupled to the horizontal bar, wherein the weight is seated on an engaged LCM cap;

a lever coupled to the horizontal bar, the lever comprising at least one pin for engaging the weight and a pivot axis;

a kick bar coupled to the support bar, whereby lowering the horizontal bar causes the kick bar to engage the lever and actuate a pivot of the lever about the pivot axis thereby causing the at least one pin of the lever to engage the weight and displace the weight relative to the cap.

11. The system of claim 10, wherein the horizontal bar is further coupled to a horizontal lead screw for actuating a lateral translation of the bar relative to the support bar.

12. The system of claim 11, wherein a lateral translation of the horizontal bar further actuates a retraction of the fork.

13. The system of claim 10, further comprising:

a spring for coupling the horizontal bar to the lever.

14. The system of claim 13, further comprising:

a second pin in the lever for engaging the weight such that, when the weight engages the second pin, a force of the spring is transmitted to counteract the weight.

15. The system of claim 10, wherein the horizontal bar is further coupled to a horizontal lead screw for actuating a lateral translation of the bar relative to the support bar.

16. An automated method of cap transfer in a LCM comprising:

providing a work surface comprising a translation stage for performing LCM;

providing a cap transfer arm coupled to the work surface for removably engaging a LCM cap;

providing a controller coupled to a memory for receiving and storing an information corresponding to one or more locations on the work surface; and

operating a movement of the cap transfer arm to place and remove a cap from one or more locations on the work surface.

17. The method of claim 16, wherein a location on the work surface is a site on a slide for performing LCM on a tissue sample.

18. The method of claim 16, wherein a location on the work surface is a QC inspection site.

19. The method of claim 16, wherein operating a movement of the cap transfer arm includes placing a cap with an LCM film on a tissue sample.

20. The method of claim 16, further comprising:

providing a Soquel sensor for sensing the presence of at least one of caps in the loading station, tissues slides, caps in the QC station, and caps in the output station.